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ABSTRACT

This activity is one of a series of 17 teacher-developed instructional activities for geography at the secondary-grade level described in SO 009 140. Through a simulation, students develop an understanding of subsistence agriculture in Central America and how it is influenced by cultural and physical factors. During four 50-minute class periods, students "live" for ten years on a subsistence-level farm, make informed decisions on crops they would plant, calculate profits and losses, and discover some reasons for resulting differences in profits and losses over the ten years. Drawing a "chance" card adds an element of uncertainty to each farmer's success. During the simulation students read maps of topography, climate and soil and use tables to calculate crop yields and prices. A postgame evaluation session facilitates verbal input by students. (DB)

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INSTRUCTIONAL ACTIVITIES SERIES IA/S-17

THE SUBSISTENCE AGRICULTURE GAME: A SIMULATION OF FARMING

by

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The majority of the world's farmers are involved in subsistence agriculture. This simulation game emphasizes the conditions associated with this economic activity by allowing students to take on the role of farmers in Central America. Realistic conditions and economic pressures are clearly portrayed as students "live" for ten years on a subsistence level farm.

TEACHER'S PACKET

Guide to Use of Game

Educational Objectives:

The Subsistence Agriculture Game allows students to take the role of subsistence farmers in Central America and experience the economic pressures faced by the farmers. The experience will lead students to an understanding of why subsistence agriculture persists in many parts of Central America.

The role of students in the game is three-fold: to 1) make informed decisions on the crops they, as subsistence farmers in Central America, would plant in their fields, 2) calculate the profits and losses on the sale of their crops to area markets, and 3) discover some reasons for the resulting differences in crop profits and losses over the years the game is in operation.

Student decisions on what crops to plant would be based in part on information gained during class discussions of the physical and cultural "controls" over agriculture which are apparent during the game operation. Specific consideration should be given to "controls" such as climate, soils,

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and landforms as well as such economic factors as transportation distances and freight rates.

Players:

Any number of players can play the game, however, with large numbers, the playing time will be increased somewhat. If the class is deemed to be too large to have each student take the role of an individual farmer, the teacher can have two students act as a team in the farming operation.

Playing Time:

This may be varied at the discretion of the individual instructor. The entire game can be completed in four class periods of 50 minutes each. Previous experience with the game indicates that these periods should be arranged consecutively. By using a consecutive sequence interest is kept at a peak until completion of the game.

Playing Procedure:

1. Hand out materials to the students. These materials are in the Student Packet and include introductory material, profit and loss sheets, departamento maps of each individual country, soil and climate maps for the region, a table of yields in pounds per acre, and a set of guidelines for the farm profit and loss report.

2. Briefly explain the win criterion for the game — to maximize profits over a 10 year period through the wise selection of crops. The winner is the person who at the end of 10 years (10 rounds of play) has the largest profit. In a sense each player may feel that he has "won" having done the best that he could with his farming conditions.

3. Have students select their farm sites. There are two ways this may be done: 1) by chance drawing, or 2) pre-selection by students. If the chance method of selection is chosen, prior to the start of the game numbered sites should be located on the base map of Central America. The base map included in this package can be made into a transparency for greater ease in viewing. Upon drawing a numbered site the student should consult the various maps for location in terms of country, departamento, distance from the departamento capital in miles, climatic zone, soil zone, and whether he is located on a road. If the farm is located on a road the mode of transport for crops will be via truck or bus at the rate of $.0001 per pound mile. If the farm is not located on a road transport will be via burro at the rate of $.0003 per pound mile. All of the foregoing information should then be recorded on the Farm Economic Profile sheet found in the Student Packet.

The other method of farm site selection would be for students to select their own sites based on their knowledge of soil and climatic conditions in Central America. They then record the basic information as listed above on the Farm Economic Profile sheet.

4. Next, players select the crops which they will plant on their ten acres of land. Initially they may plant corn, beans, or rice, alone or in

combination of one acre plots, up to ten acres total.

5. Once the acreage in crops has been decided upon, the action portion of the game begins. The instructor now reveals what has happened in the first year with respect to crop yields for various crops in the various zones using the information given on the charts entitled, "Percentage Variation in Yearly Crop Yields, 1960-1970." The students then calculate their yields using this information and the table entitled "Guidelines for Determining Yearly Crop Yields" from their packet. This will then tell them how many pounds per crop they grew. Next they will multiply the pounds times the cost per pound to produce each crop in order to determine this expense. The production cost per pound for each crop is on the information sheet for each crop. Next they will take total poundage and multiply it times the number of miles to market times the freight rate. For example, if a farmer is transporting 8,000 pounds 15 miles to market by burro he would multiply 8,000 times 15 times $.0003 for a total transport cost of $36.00. The students should then sum transport and production costs in order to arrive at the total expense for the year.

6. When the instructor determines that the class has made the necessary calculations he should reveal the market price for various crops in the five countries using the information from the sheet entitled "Price Per Pound for Selected Central American Crops." Students can then calculate the income they received for their produce by multiplying price per pound times pounds of crops produced. Expenses should then be subtracted from income and the results should be recorded.

Now comes a surprise element in the game:

7. The final part of the round involves having each student draw a card from the chance pile and then following instructions printed on the card. Three things can happen. One, the farmer will have had a normal year and no further expenses will be incurred. Two, something unfortunate will have happened in which case an unexpected expense will be deducted from profits. Third, something fortunate will have occurred and some money will be added to profits. This marks the end of year (round) one and students will be able to see how they fared for the first year. All data should be recorded on profit and loss sheets for each year.

8. The next 9 rounds follow the same pattern in which students select crops, calculate expenses and income, and draw a chance card. Students may change crops as they see fit and add tobacco, cotton, and coffee when enough capital has been accumulated. Remember: When the latter three crops are planted there is an initial fee (expense) in the first year they are planted. Also, if a student goes "broke" at any time he may continue the game but should keep track of his losses.

9. At the end of ten rounds students should calculate their total profits with the highest total being the winner. Usually during the course of the game, competition develops as players compare earnings and losses.

10. Upon completion of the game an evaluation and discussion period should follow to elicit students' impressions gained from their experiences as subsistence farmers. An alternative to this is to have each student write a brief

report based on the page in the Student Packet labeled "Guidelines for Farm Profit and Loss Report". The evaluation session then might be built around the reports.

Post Game Evaluation Session

The length of time devoted to questions related to the game may be gauged by the instructor. It is important that an evaluation session be held in order that students might have an opportunity for verbal input. Following are some sample questions which might be asked.

1. What were significant factors in determining success or failure in farming? (Possible responses - Soil type, climatic variations, changing market prices, crop selection, transport costs, chance items.)

2. Was any one factor more significant than any other?

3. What restraints do you see operating upon the farmer? (Possible responses - Lack of choice, lack of capital, lack of land.)

4. Having played the game how do you now feel toward the position of the subsistence farmer?

Teaching Packet Materials

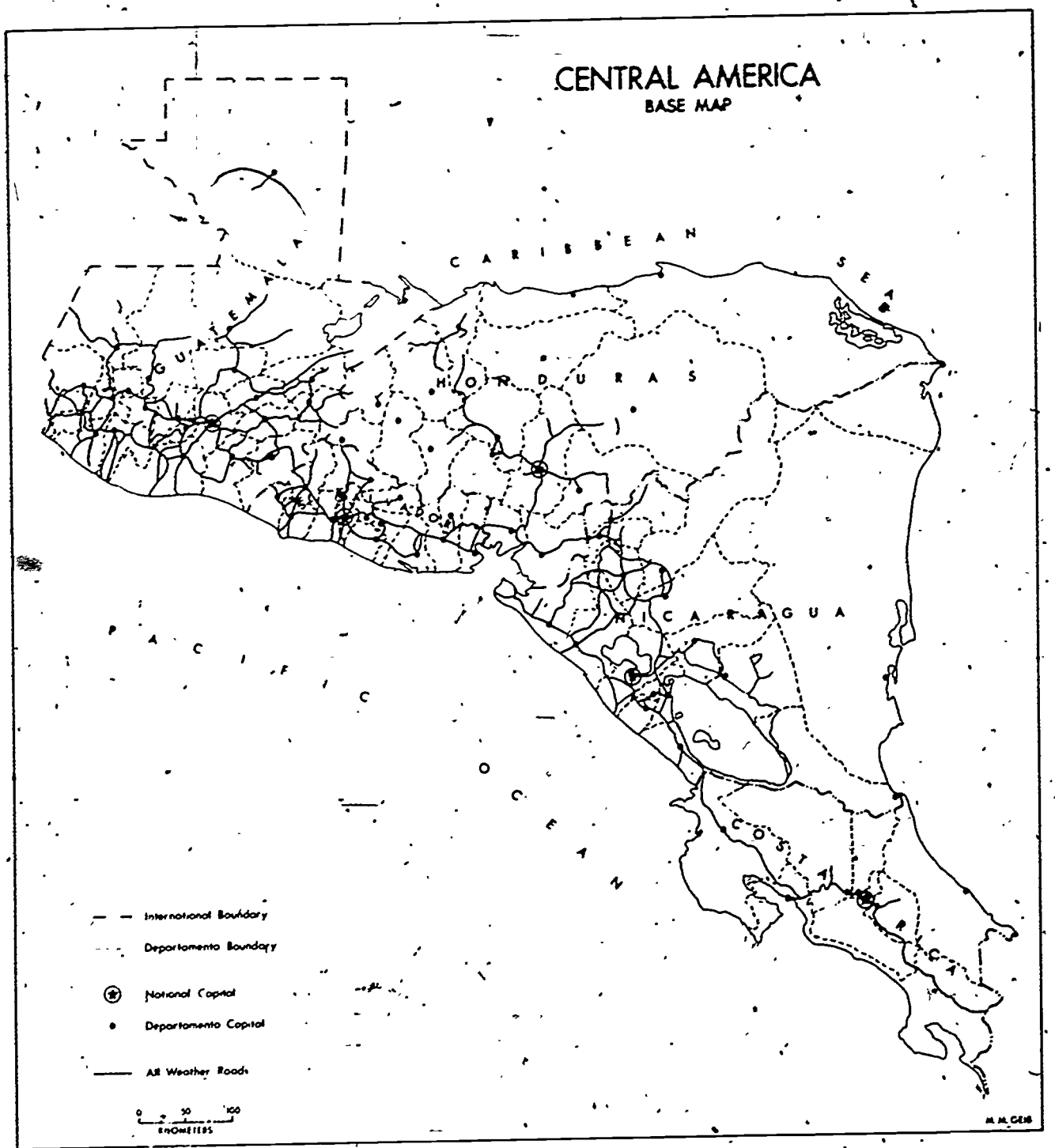
Maps

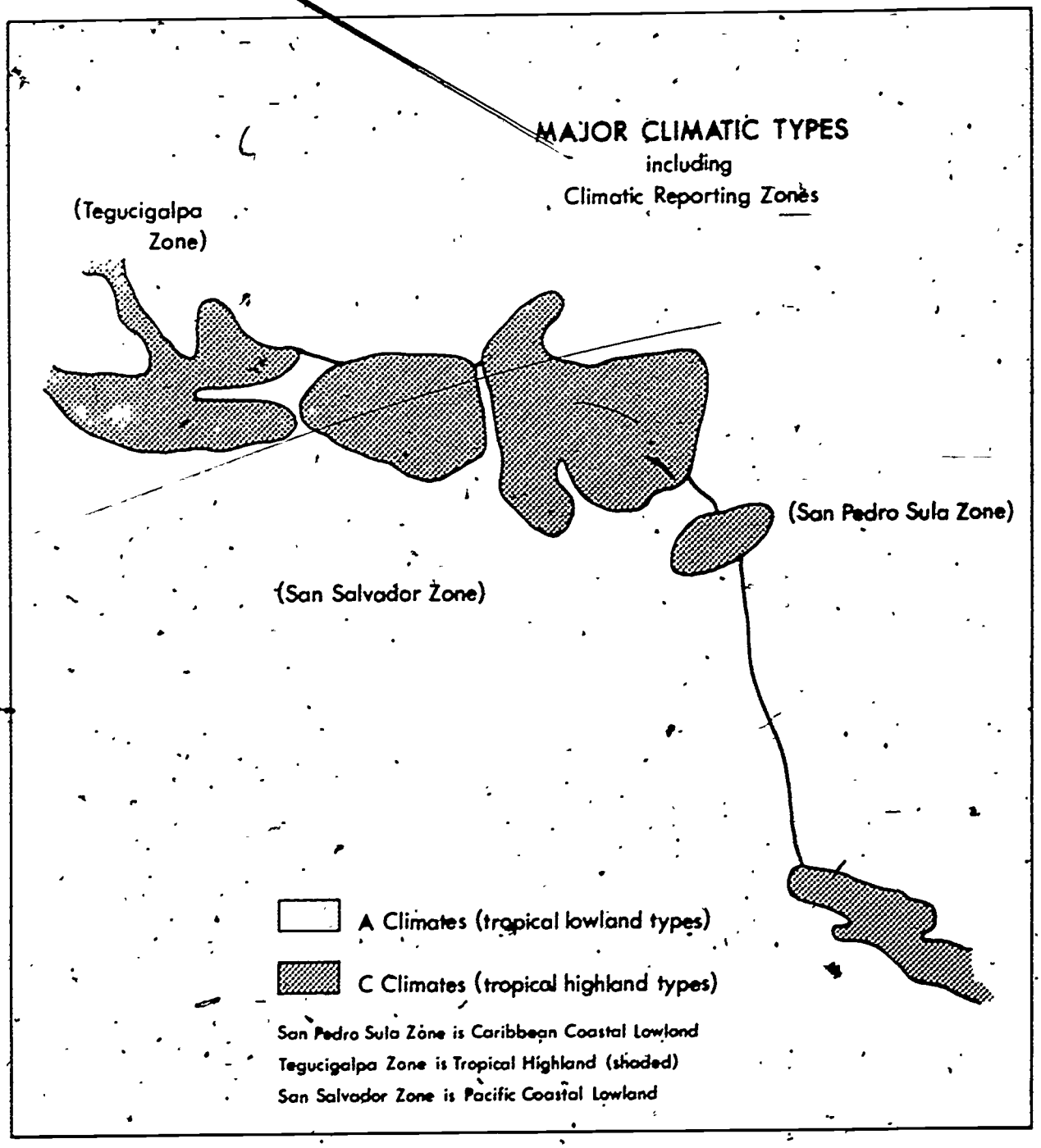
Central America Base
Central America Major Climate Types
Central America Soil Types
Costa Rica
El Salvador
Guatamala
Houndurus
Nicaragua

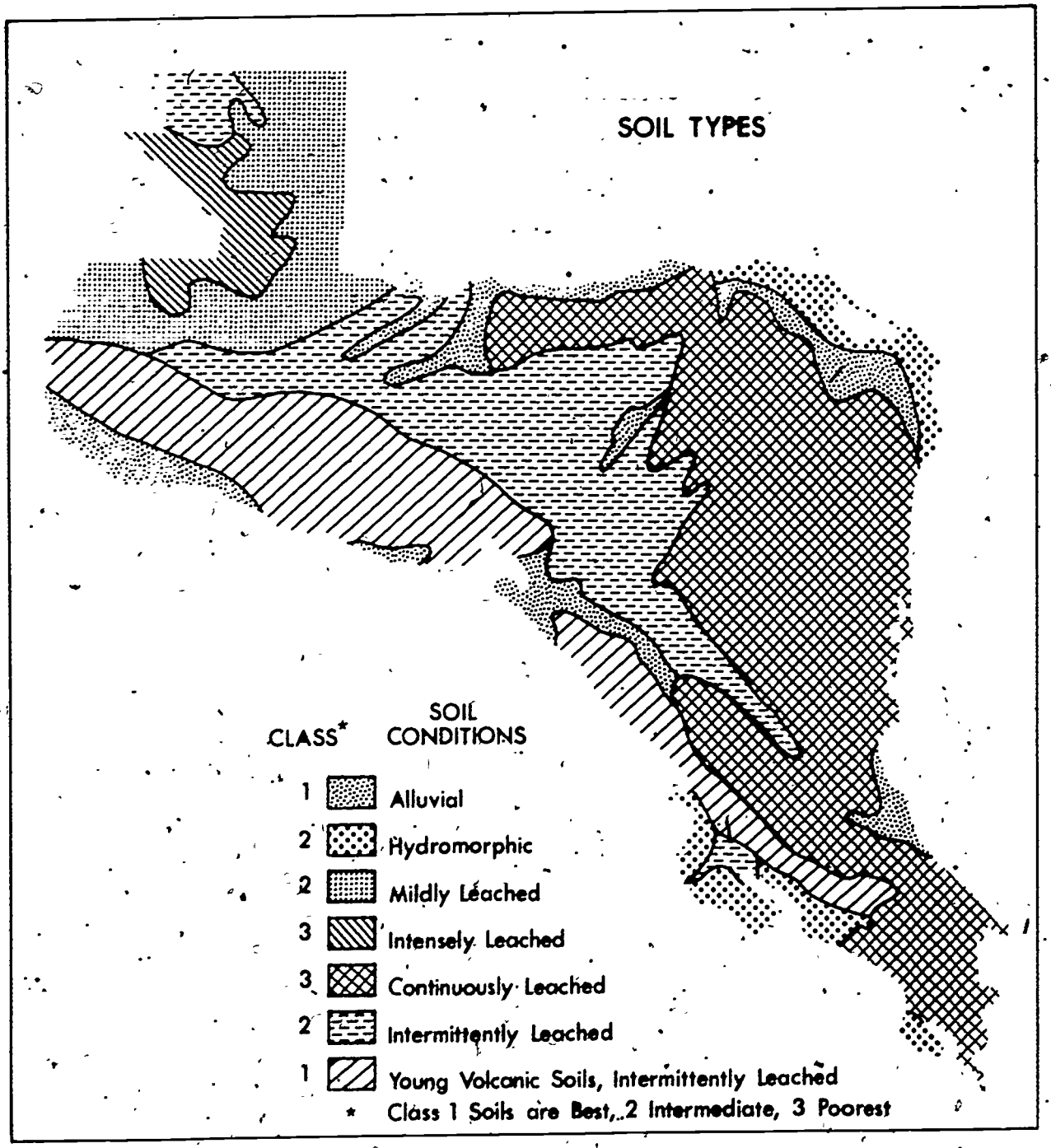
Note: Transparencies should be made of all maps so they can be viewed by the whole class at the same time. The alternative is to provide each student with a set of maps.

Information Tables

Percentage Variation in Yearly Crop Yields
Price Per Pound for Selected Central American Crops
Chance Cards

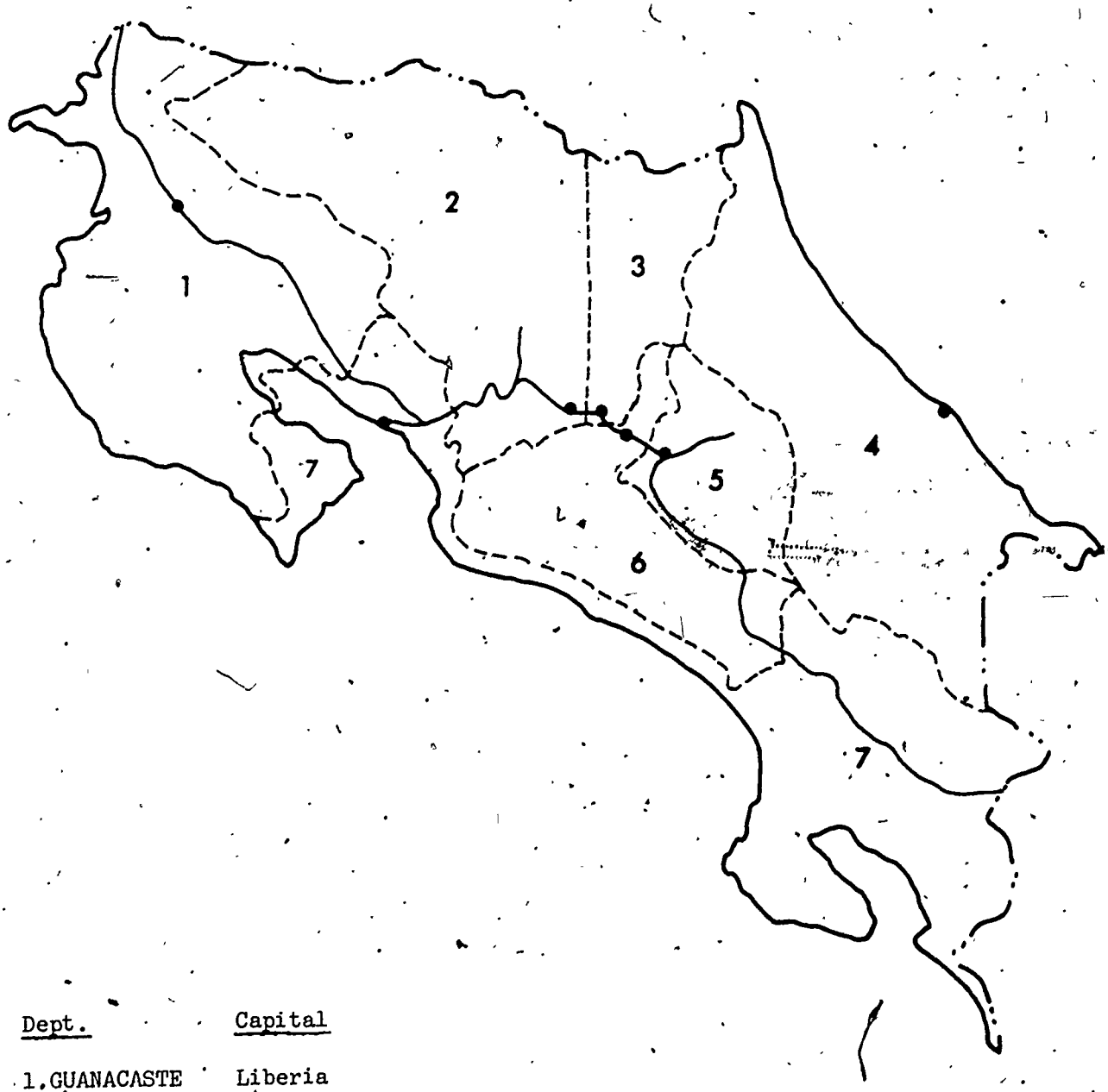

CENTRAL AMERICA
BASE MAP
CARIBBEAN SEA
GUATEMALA
HONDURAS
EL SALVADOR
NICARAGUA
COSTA RICA
PACIFIC OCEAN
International Boundary
Departamento Boundary
National Capital
Departamento Capital
All Weather Roads
0 50 100
KILOMETERS
M.M.GEIS


MAJOR CLIMATIC TYPES
including
Climatic Reporting Zones
(Tegucigalpa Zone)
(San Pedro Sula Zone)
(San Salvador Zone)
A Climates (tropical lowland types)
C Climates (tropical highland types)
San Pedro Sula Zone is Caribbean Coastal Lowland
Tegucigalpa Zone is Tropical Highland (shaded)
San Salvador Zone is Pacific Coastal Lowland


SOIL TYPES
CLASS*
SOIL CONDITIONS
1 Alluvial
2 Hydromorphic
2 Mildly Leached
3 Intensely Leached
3 Continuously Leached
2 Intermittently Leached
1 Young Volcanic Soils, Intermittently Leached
* Class 1 Soils are Best, 2 Intermediate, 3 Poorest

COSTA RICA

·DEPARTAMENTO BASE MAP



Dept.	Capital
1.GUANACASTE	Liberia
2.ALAJUELA	Alajuela
3.HEREDIA	Heredia
4.LIMON	Puerto Limon
5.CARTAGO	Cartago
6.SAN JOSE	San Jose
7.PUNTARENAS	Puntarenas

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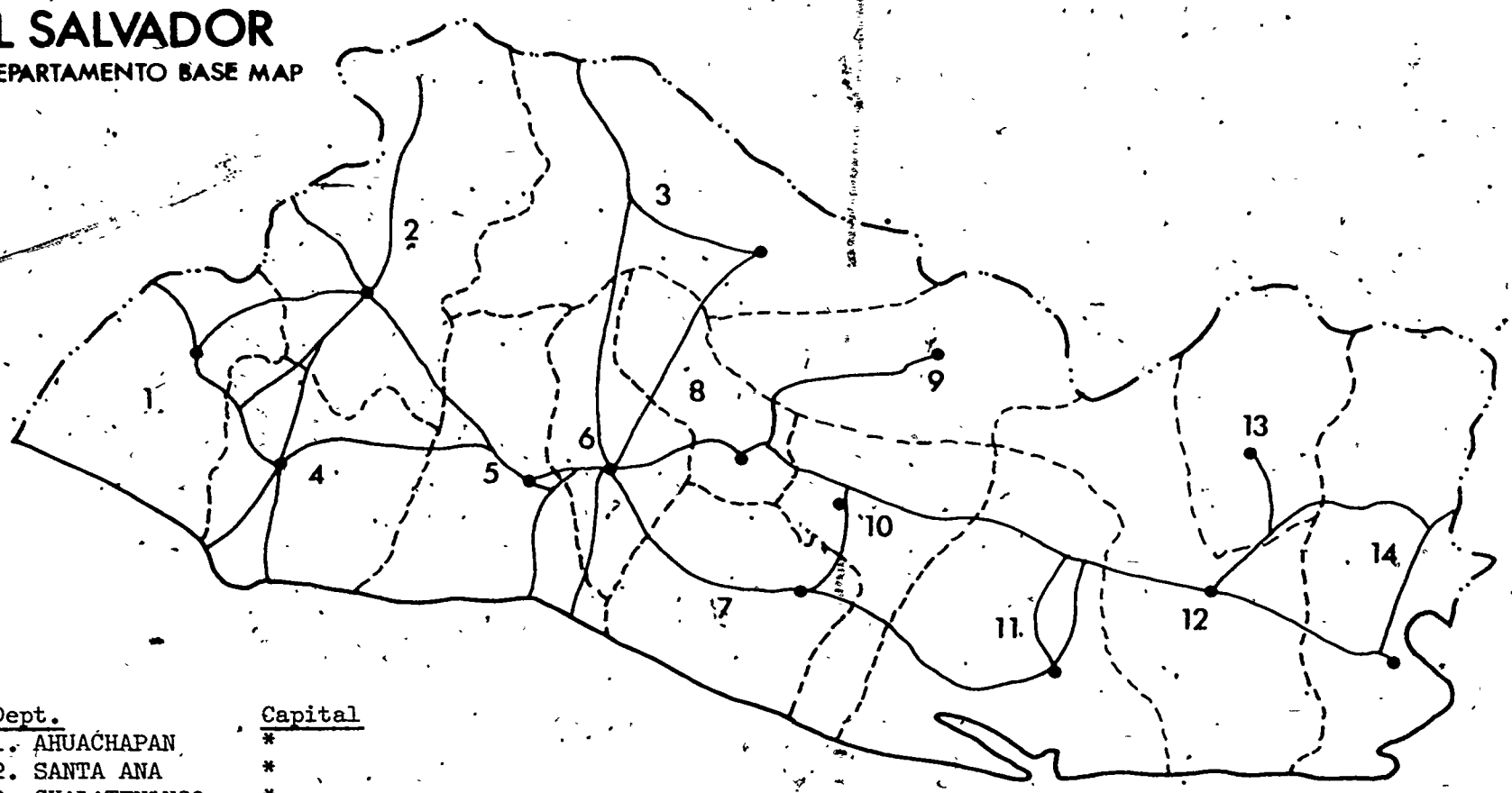
M.M.GEIB

EL SALVADOR

DEPARTAMENTO BASE MAP



Dept.	Capital
1. AHUACHAPAN	*
2. SANTA ANA	*
3. CHALATENANGO	*
4. SONSONATE	*
5. LA LIBERTAD	Nueva San Salvador
6. SAN SALVADOR	*
7. LA PAZ	Zacatecoluca
8. CUSCATLAN	Colutepeque
9. CABANAS	Sensuatepeque
10. SAN VICENTE	*
11. USULUTAN	*
12. SAN MIGUEL	*
13. MORAZAN	San Francisco
14. LA UNION	*

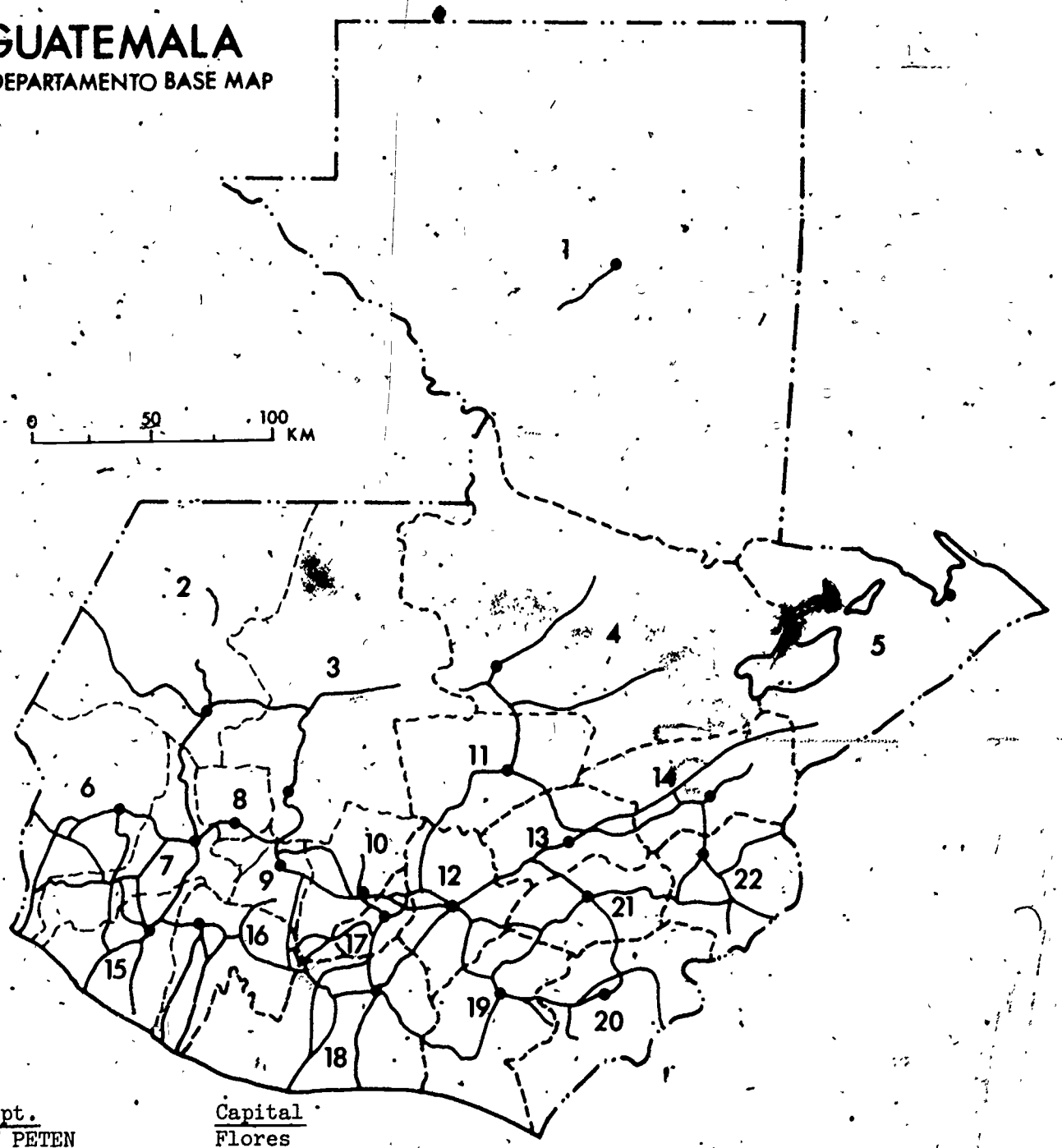
* Capital has same name as dept.

0 50 KM

M.M. GEIB

GUATEMALA

DEPARTAMENTO BASE MAP



Dept.	Capital		
1. PETEN	Flores	12. GUATEMALA	Guatemala City
2. HUEHUETENANGO	*	13. EL PROGRESO	*
3. EL QUICHE	St. Cruz del Quiche	14. ZACAPA	*
4. ALTA VERAPAZ	Coban	15. RETALHULEU	*
5. IZABEL	Pt. Barrios	16. SUCHITEPEQUEZ	Mazatenango
6. SAN MARCOS	La Union	17. SACATEPEQUEZ	Antigua
7. QUEZALTENANGO	*	18. ESCUINTLA	*
8. TOTONICAPAN	*	19. SANTA ROSA	Cuilapa
9. SOLOLA	*	20. JUTIAPA	*
10. CHIMALTENANGO	*	21. JALAPA	*
11. BAJA VERAPAZ	Salama	22. CHIQUIMULA	*

* Capital has same name as dept.

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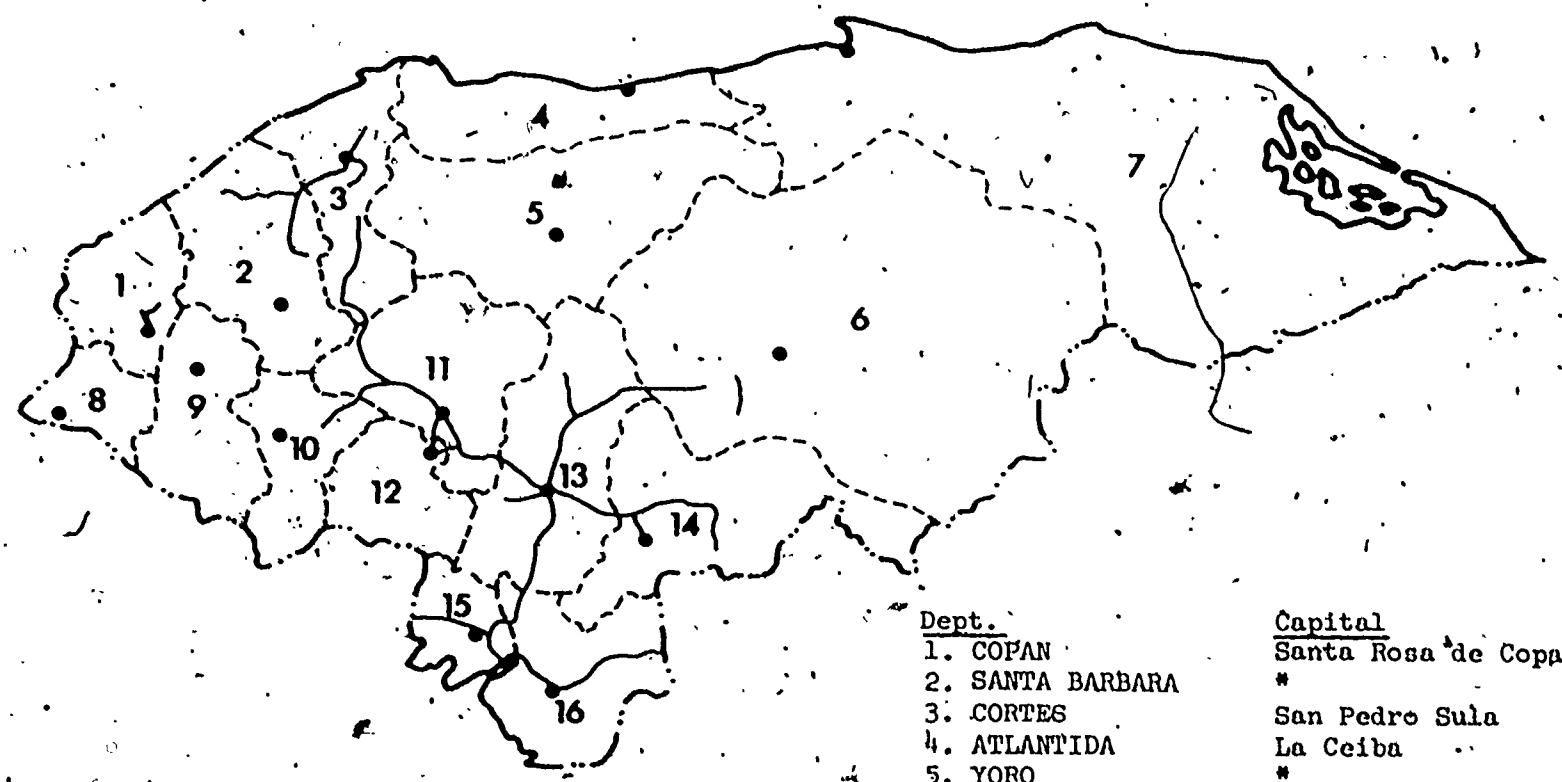
HONDURAS

DEPARTAMENTO BASE MAP



Dept.	Capital
1. COPAN	Santa Rosa de Copan
2. SANTA BARBARA	*
3. CORTES	San Pedro Sula
4. ATLANTIDA	La Ceiba
5. YORO	*
6. OLANCHO	Juticalpa
7. COLON	Trujillo
8. OCOTEPEQUE	Nueva Ocotepeque
9. LEMPIRA	Gracias
10. INTIBUCA	La Esperanza
11. COMAYAGUA	*
12. LA PAZ	*
13. FRANCISCO MORAZAN	Tegucigalpa
14. EL PARAISO	Yuscaran
15. VALLE	Nacaome
16. CHOLUTECA.	*

* Capital has same name as dept.

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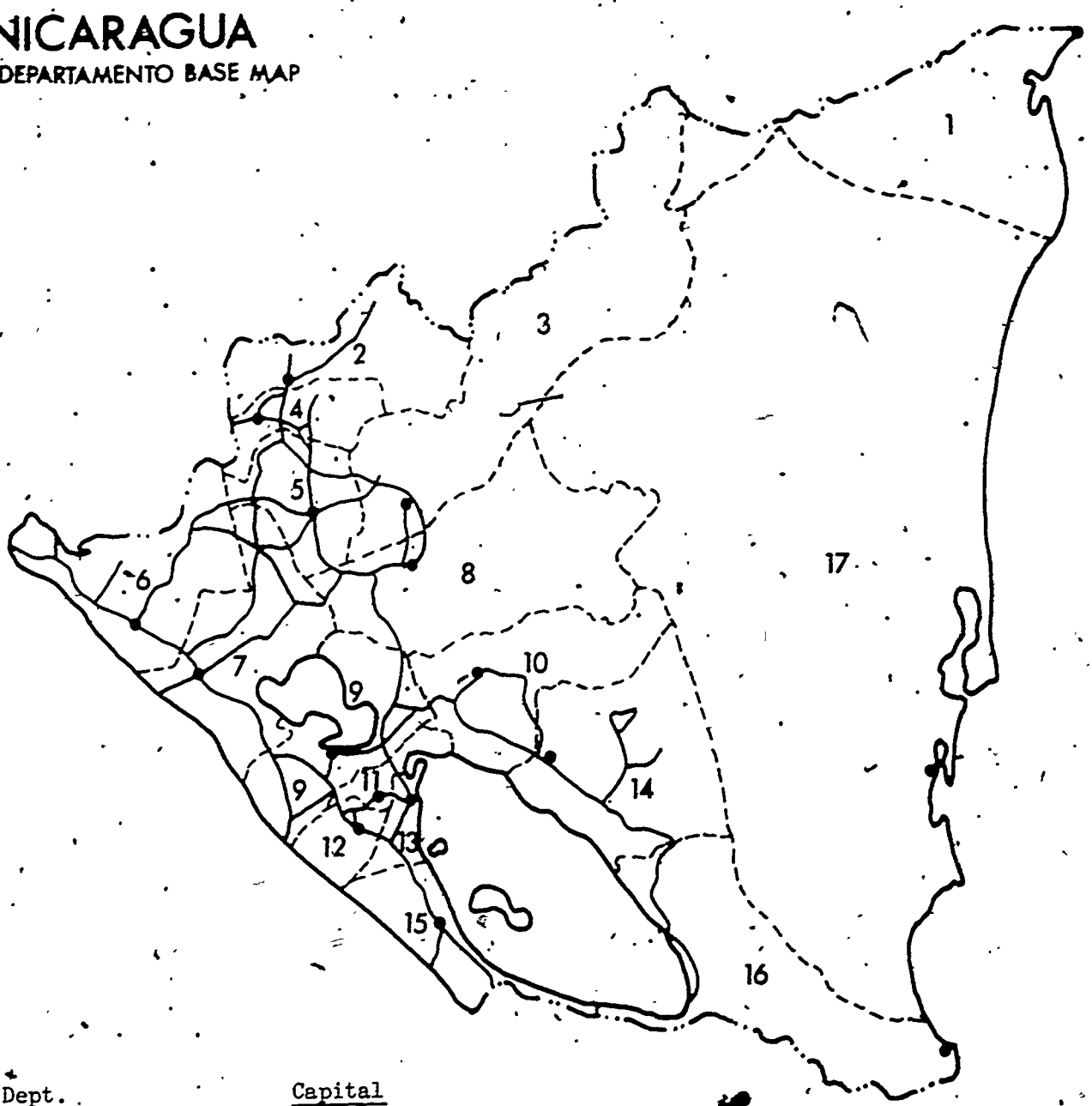
NICARAGUA

DEPARTAMENTO BASE MAP



Dept.	Capital
1. COMARCA DEL CABO	Pt. Cabo Gracias a Dios
2. NUEVA SEGOVIA	Ocotal
3. JINOTEGA	*
4. MADRIZ	Somoto
5. ESTELI	*
6. CHINANDEGA	*
7. LEON	*
8. MATAGALPA	*
9. MANAGUA	*
10. BOACO	*
11. MASAYA	*
12. CARAZO	Jinotepe
13. GRANADA	*
14. CHONTALES	Juigalpa
15. RIVAS	Rivas
16. RIO SAN JUAN	San Juan del Norte
17. ZELAYA	Bluefields

*Capital has same name as dept.

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SUBSISTENCE AGRICULTURE GAME
PERCENTAGE VARIATION IN YEARLY CROP YIELDS, 1960-1970[1]
(SEE ALSO "GUIDELINES FOR DETERMINING YEARLY CROP YIELDS" IN STUDENT PACKET)

1960 Climate Region

	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
Crop[2]	1	2	3	1	2	3	1	2	3
Corn	-10	-20	-30	avg	-10	-20	-20	-30	-40
Beans	avg	-10	-20	-10	-20	-30	-20	-30	-40
Rice	avg	-10	-20	avg	-10	-20	-20	-30	-40
Coffee[3]									
Tobacco[3]									
Cotton[3]									

1961 Climate Region

	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
Crop	1	2	3	1	2	3	1	2	3
Corn	+10	avg	-10	+10	avg	-10	avg	-10	-20
Beans	avg	-10	-20	avg	-10	-20	-10	-20	-30
Rice	avg	-10	-20	avg	-10	-20	-10	-20	-30
Coffee									
Tobacco	-10	-20	-30	-10	-20	-30	-10	-20	-30
Cotton									

1. These percentages are based on meterological data, soil information and educated guess; they should not be considered authoritative.
2. The abbreviation "avg" refers to average values found in "Guidelines for Determining Yearly Crop Yields" in the Subsistence Agriculture Game Manual.
3. It is unlikely that these crops would be grown so early in the game.

1962 Climate Region

	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
Crop	1	2	3	1	2	3	1	2	3
Corn	+10	avg	-10	+20	+10	avg	+30	+20	+10
Beans	+20	+10	avg	+20	+10	avg	+20	+10	avg
Rice	+10	avg	-10	+10	avg	-10	+20	+10	avg
Coffee	+10	avg	-10	+10	avg	-10	+10	avg	-10
Tobacco	-10	-20	-30	+10	avg	-10	+10	avg	-10
Cotton	+10	avg	-10	+10	avg	-10	+10	avg	-10

1963 Climate Region

	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
Crop	1	2	3	1	2	3	1	2	3
Corn	avg	-10	-20	+10	avg	-10	+10	avg	-10
Beans	+10	avg	-10	+20	+10	avg	+10	avg	-10
Rice	+10	avg	-10	+10	avg	-10	+10	avg	-10
Coffee	avg	-10	-20	+10	avg	-10	avg	-10	-20
Tobacco	-10	-20	-30	avg	-10	-20	+10	avg	-10
Cotton	avg	-10	-20	+10	avg	-10	avg	-10	-20

1964 Climate Region

	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
Crop	1	2	3	1	2	3	1	2	3
Corn	+10	avg	-10	-10	-20	-30	avg	-10	-20
Beans	+10	avg	-10	+10	avg	-10	-10	-20	-30
Rice	+10	avg	-10	avg	-10	-20	avg	-10	-20
Coffee	avg	-10	-20	-10	-20	-30	-10	-20	-30
Tobacco	+10	avg	-10	avg	-10	-20	+10	avg	-10
Cotton	avg	-10	-20	-10	-20	-30	-10	-20	-30

1965
Climate Region

Crop	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
	1	2	3	1	2	3	1	2	3
Corn	+10	avg	-10	+10	avg	-10	+10	avg	-10
Beans	+20	+10	avg	+20	+10	avg	+10	avg	-10
Rice	+10	avg	-10	+10	avg	-10	+10	avg	-10
Coffee	+10	avg	-10	+10	avg	-10	+10	avg	-10
Tobacco	+10	avg	-10	+20	+10	avg	+30	+20	+10
Cotton	+10	avg	-10	+10	avg	-10	+10	avg	-10

1966
Climate Region

Crop	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
	1	2	3	1	2	3	1	2	3
Corn	+30	+20	+10	-10	-20	-30	-10	-20	-30
Beans	+30	+20	+10	-10	-20	-30	+10	avg	-10
Rice	+30	+20	+10	-10	-20	-30	-10	-20	-30
Coffee	+10	avg	-10	-10	-20	-30	-10	-20	-30
Tobacco	+20	+10	avg	+20	+10	avg	+20	+10	avg
Cotton	+10	avg	-10	-10	-20	-30	-10	-20	-30

1967
Climate Region

Crop	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
	1	2	3	1	2	3	1	2	3
Corn	+20	+10	avg	+20	+10	avg	+10	avg	-10
Beans	+10	avg	-10	+10	avg	-10	+30	+20	+10
Rice	+20	+10	avg	+20	+10	avg	+10	avg	-10
Coffee	+10	avg	-10	+20	+10	avg	+10	avg	-10
Tobacco	+20	+10	avg	+10	avg	-10	+10	avg	-10
Cotton	+10	avg	-10	+20	+10	avg	+10	avg	-10

1968
Climate Region

Crop	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
	1	2	3	1	2	3	1	2	3
Corn	+10	avg	-10	-10	-20	-30	+20	+10	avg
Beans	+20	+10	avg	+10	avg	-10	+30	+20	+10
Rice	+10	avg	-10	+10	avg	-10	+20	+10	avg
Coffee	+10	avg	-10	+10	avg	-10	+20	+10	avg
Tobacco	+10	avg	-10	+10	avg	-10	+30	+20	+10
Cotton	+10	avg	-10	+10	avg	-10	+20	+10	avg

1969
Climate Region

Crop	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
	1	2	3	1	2	3	1	2	3
Corn	+10	avg	-10	+10	avg	-10	+10	avg	-10
Beans	+30	+20	+10	+10	avg	-10	+10	avg	-10
Rice	+20	+10	avg	+10	avg	-10	+10	avg	-10
Coffee	+30	avg	-10	+10	avg	-10	+10	avg	-10
Tobacco	+30	avg	-10	+30	+20	+10	+10	avg	-10
Cotton	+30	avg	-10	+10	avg	-10	+10	avg	-10

1970
Climate Region

Crop	San Salvador Soil Region			Tegucigalpa Soil Region			San Pedro Sula Soil Region		
	1	2	3	1	2	3	1	2	3
Corn	+20	+10	avg	+10	avg	-10	+10	avg	-10
Beans	+40	+30	+20	+10	avg	-10	+10	avg	-10
Rice	+30	+20	+10	+10	avg	-10	avg	-10	-20
Coffee	+20	+10	avg	+20	+10	avg	+10	avg	-10
Tobacco	+20	+10	avg	+30	+20	+10	+10	avg	-10
Cotton	+20	+10	avg	+20	+10	avg	+10	avg	-10

PRICE PER POUND FOR SELECTED CENTRAL AMERICAN CROPS, REPORTED BY COUNTRY, 1960-1970[1]

Year	Country	Corn	Beans	Rice	Tobacco[2]	Coffee[2]	Cotton[2]
1960	Guatemala	.03	.07	.07			
	El Salvador	.03	.08	.08			
	Honduras	.03	.08	.10			
	Nicaragua	.02	.06	.07			
	Costa Rica	.03	.07	.08			
1961	Guatemala	.03	.09	.09	.30		
	El Salvador	.03	.09	.08	.30		
	Honduras	.04	.09	.10	.30		
	Nicaragua	.04	.09	.10	.30		
	Costa Rica	.05	.10	.11	.30		
1962	Guatemala	.04	.09	.09	.31	.32	.10
	El Salvador	.03	.09	.10	.29	.36	.09
	Honduras	.03	.08	.11	.30	.34	.10
	Nicaragua	.03	.06	.09	.31	.38	.09
	Costa Rica	.04	.07	.10	.30	.40	.08
1963	Guatemala	.03	.08	.08	.28	.23	.17
	El Salvador	.03	.08	.10	.28	.25	.17
	Honduras	.03	.08	.09	.28	.25	.17
	Nicaragua	.04	.07	.09	.28	.27	.17
	Costa Rica	.04	.07	.09	.28	.25	.17
1964	Guatemala	.04	.09	.09	.25	.30	.18
	El Salvador	.04	.09	.10	.25	.30	.18
	Honduras	.05	.08	.10	.24	.30	.18
	Nicaragua	.05	.08	.09	.25	.30	.18
	Costa Rica	.06	.09	.10	.25	.30	.18
1965	Guatemala	.04	.10	.06	.23	.26	.17
	El Salvador	.04	.09	.10	.23	.26	.17
	Honduras	.05	.08	.10	.23	.26	.17
	Nicaragua	.05	.08	.10	.23	.26	.17
	Costa Rica	.06	.09	.11	.23	.26	.17

PRICE PER POUND FOR SELECTED CENTRAL AMERICAN CROPS, REPORTED BY COUNTRY, 1960-1970[1]

Year	Country	Corn	Beans	Rice	Tobacco[2]	Coffee[2]	Cotton[2]
1966	Guatemala	.03	.07	.12	.26	.23	.15
	El Salvador	.03	.08	.10	.26	.23	.15
	Honduras	.04	.09	.10	.26	.23	.15
	Nicaragua	.05	.09	.11	.26	.23	.15
	Costa Rica	.06	.10	.10	.26	.23	.15
1967	Guatemala	.04	.09	.11	.20	.21	.13
	El Salvador	.04	.09	.10	.20	.21	.13
	Honduras	.03	.10	.12	.20	.21	.13
	Nicaragua	.04	.09	.10	.20	.21	.13
	Costa Rica	.04	.10	.11	.20	.21	.13
1968	Guatemala	.05	.10	.11	.18	.10	.14
	El Salvador	.04	.10	.10	.18	.10	.14
	Honduras	.05	.19	.10	.18	.19	.14
	Nicaragua	.05	.09	.12	.18	.19	.14
	Costa Rica	.05	.10	.11	.18	.19	.14
1969	Guatemala	.05	.10	.11	.20	.17	.16
	El Salvador	.03	.10	.08	.20	.17	.16
	Honduras	.03	.10	.09	.20	.17	.16
	Nicaragua	.02	.10	.10	.20	.17	.16
	Costa Rica	.03	.10	.11	.20	.17	.16
1970	Guatemala	.05	.12	.12	.22	.15	.18
	El Salvador	.03	.13	.09	.22	.15	.18
	Honduras	.04	.15	.10	.22	.15	.18
	Nicaragua	.06	.16	.10	.22	.15	.18
	Costa Rica	.06	.16	.10	.22	.15	.18

1. These prices are based in part on official sources and data available from the records of the Agency for International Development. In some cases prices have been changed in the interests of game continuity.

2. Prices in some years are not reported because it is unlikely that these crops would be grown so early in the game.

CHANCE CARDS

Government Army Camp Built: Yields down 50%; prices down 20% (you are among those who run to the hills)

Government Army Camp Built: Yields up 10% prices up 20% (you are sympathizer).

Your daughter is being married and you are expected to host a large fiesta for the villagers. The cost will be $350.00. You may need to spread this expense over several years.

Predial larceny of crops has never been a serious problem in your area, however, a recent rash of thievery deprived you of $50 worth of your crops.

Celebrate with some pulque for a normal year.

A shot of tequila for a normal year.

Trucker's Strike: Truck transport cost up 100% this year. No change in burro transport costs.

This has been a good year for you in that nothing unusual happened, either good or bad.

Conditions normal this year.

CHANCE CARDS

The Saints be praised for a normal year.

A truck carrying seed corn upset near your farm and you were able to get free seed this year. Subtract the cost of planting corn this year.

WHOOPS! Truck carrying your produce slips off cliff. You rescue some, but yields effectively down 90%.

International coffee market folds; all farmers suffer. Corn, beans, rice prices down 10%. Tobacco and cotton prices down 20%. Coffee prices down 30%.

LAND REFORM ACT! Lose 10% of your land under cultivation for the rest of the game.

Last year you were experimental farmer of the year and received a tractor. Now the tractor has run out of gas. Yields down 30%.

A truck carrying rice seed upset near your farm and you were able to get free seed this year. Subtract the cost of planting rice this year.

Occasionally subsistence farmers get lucky and have a normal year.

Poor soil management finally catches up with your plot. Yields down 20%. Production costs up 30%.

CHANCE CARDS

All was well with you this year.

Hooray for a year without adversity.

You had a normal year.

Heavy rains have washed out your only available bridge to the highway. If you were using truck transportation this year you must use a burro for moving your crops to market. Therefore, figure transport costs this year via burro.

Occasionally good things happen to subsistence farmers. This year you received a tax refund of $55.

Hooray for a normal year.

Because part of your farm was used this year as an experimental plot for a new hybrid maize, the local Committee for the Improvement of Farming is paying you a $150 gratuity.

You tried a new strain of hybrid corn this year. Result: A yield increase of 50%.

As a member in good standing of your local agricultural cooperative you received a dividend of $75.

CHANCE CARDS

The San Salvador zone suffered a severe drought this year ruining the entire crop of tobacco and coffee. If you had these crops planted, you lost all of them.

San Pedro Sula zone received too much rain this year. You lost 50% of your crop.

A new bridge was built on your farm to market road. The assessment to you is $30.

A heavy infestation of boll weevil attacked your cotton crop. If you raised cotton deduct 40% of your crop.

A healthy baby was born to your family. Deduct $50 from this year's profits.

Halfway to market your burro ran off with $50 of your product. Subtract this from this year's profits.

Conditions were optimal for tobacco this year. Yields are up 20%.

No major bills this year.

Worst hurricane in years! Yields down 70%. Prices up 80%.

CHANCE CARDS

The villagers have chosen you to host a party on the Day of the Blessed Virgin. The cost to you is $90.

As with all things burros also tend to get old and wear out. Replace old Pedro with a new burro and add an expense of $50 this year.

Your star must be right. A normal year.

CHANCE CARDS

You squeaked by another year without any large losses.

A hurricane wiped out 30% of your crop if your farm is in the Tegucigalpa climatic zone.

No major catastrophes this year.

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Count your blessings. A normal year.

No untoward events occurred this year.

Normalcy reigned this year.

How lucky can you get? A normal year.

Happy days are here again. A normal year.

Your village is sponsoring a baseball team this summer. Your contribution to this endeavor is $2.

Everything was normal this year.

Normalcy for the year.

A new elementary school has been erected in your municipio. The assessment to you for its construction is $25.

You had a normal year.

A bad drought in mid summer reduced your crops by 10%. Deduct that amount from all you raised.

A new gravel road has been constructed past your farm. Pay $50 this year for its construction.

CHANCE CARDS

One night just before harvest a neighbor's herd of cattle broke into your fields and destroyed $200 worth of crops. Unfortunately, you had no insurance and cannot be reimbursed from this loss.	Burro dies! Transport cost up 100%.	No unforeseen problems this year.
If you are located in Costa Rica, unfortunately, Irazu Volcano erupted showering a layer of volcanic dust over your farm and causing $300 damage to your crops.	How fortunate you are. No diseases or natural catastrophes this year.	No unforeseen problems this year.
The major earthquake just missed you.	Thank God for a normal year.	A new type of herbicide you used increased yields on all your crops by 20%.

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CHANCE CARDS

Thanks for no unforeseen problems this year.	No unforeseen problems this year.	In return for a favor you did for him, your neighbor took your crop to market for you and paid for the transportation costs himself.
EARTHQUAKE! Yields down 80%.	United Fruit crop duster sprays your farm! Unfortunately the DDT was contaminated with a herbicide that damaged your crops. Yields down 20%.	Residual carryover of a herbicide you used the previous year damaged your crops. Result: 10% decrease in yield.
This year was a good one in Middle America. No bad events took place.	The bluebird of happiness has come to grace your poinsettia tree and brought you an ordinary year.	Your truck broke down. By the time you got to market, you had to take a smaller price for your crop. Subtract $.02 per pound for each crop.

CHANCE CARDS

No unforeseen gains or losses this year.

You have been selected as experimental farmer of your country! You get the use of a tractor for one year. Yields up 20%.

The Saints be praised for a normal year.

Your bank account suffered no major catastrophies.

No unforeseen expenses this year.

Hurricanes and earthquakes and plagues missed you this year.

No weddings, no fiestas to pay for, just a normal year.

Sometimes you get lucky. A normal year.

How lucky can you get? A normal year.

CHANCE CARDS

Dustfall from a nearby volcano added a nutritious layer of topsoil to your land. Crop yields increase 10%.

Dustfall from a nearby volcano added a nutritious layer of topsoil to your land. Crop yields increased 10%.

Your eldest daughter contracted a severe case of malaria and was hospitalized for three weeks. The cost of treatment was $200.

An earthquake struck the Middle American countries causing extensive damage and loss of life. Damage to your home amounted to $250.

The quetzal bird of happiness has perched on your roof. No untoward occurances took place in your economy this year.

FLOOD! Yields down 60%.

You have gained social status in your community and, therefore, you are to host a fiesta on the day of Our Lady of Guadeloupe. The expenses will cost you $200.

There were no adverse agricultural conditions this year.

The Lord be Praised! A normal year.

CHANCE CARDS

A truck carrying bean seeds upset near your farm and you were able to get free seed this year. Subtract the cost of planting beans this year.

A lightning storm passed over your farm and numberous strikes into the ground added nitrogen to the soil. Thus, crop yields are up 10% this year.

World demand for cotton is up and so are prices. Add 10% to cotton profits.

The world demand for coffee increased this year and prices went up. Add 20% to coffee profits this year.

Your program of using animal fertilizer is beginning to pay off. Crop yields are up 20% this year.

This year was a normal year in that there were no unfortunate happenstances to your operations.

Count your blessings. No additonal expenses this year.

If you live in Nicaragua, Gen. Somoza passed through your area and gave you $100 as a kindly gesture.

Government collapses! Production drops 10%; prices rise 20%.

CHANCE CARDS

As they say in Costa Rica: "Esta Bien Este Ano"

Smile! It was a normal year.

No abnormal losses or gains this year.

Oh Sweet Normalcy!

You tried a new strain of hybrid beans this year. Result: A yield increase of 50%.

You tried a new strain of hybrid rice this year. Result: A yield increase of 50%.

A new type of insecticide you used increased yields on all crops by 20%.

Normalcy was the event of the year.

Happy days are here again. A normal year.

CHANCE CARDS

Not every year is bad this was a normal year.

No major expenses this year.

Thanks for a normal year.

Normalcy is not a four letter word. It's better.

Things were okay for you this year.

Dancing in the streets. A normal year.

Sleep well. A normal year.

BULLETIN! Your farm has just been annexed by the city. Taxes up, more snoopy neighbors with big feet in your garden plot. Production costs up 30%.

All cousins leave for the city! Work force disappears. Production costs up 50%.

Since you are highly revered in your community the gifts from neighbors on your birthday totaled $50.

You inherited $125 upon the death of your patron.

Este ano era normal.

Peace Corps volunteer weeds your plot while your back is turned. He had trouble distinguishing weeds from the crop. Yields down 10%.

Normalcy esta magnifico.

No untoward events occurred to you this year.

CHANCE CARDS

SUBSISTENCE AGRICULTURE GAME

Student Packet

Guide to Play

You are a subsistence farmer in Central America. You are a traditional farmer; that is, you farm because that is your way of life rather than because you wish to make money. Like nearly everyone, however, you wish to have a better life if at all possible. You realize that if you can increase your volume of surplus crops for sale, more money and more of the better things in life will be available to you and your family. In 1960 you accumulate a stake of $50, apply for land from an international land development agency, and start to dream of your own farm.[1]

Because you are aware of the fact that increased production means more surplus crops for sale and, therefore, more goods for your family, you know something about the crops you produce, including their average yields, the cost of production, yearly market prices and transport costs. Moreover, you are aware of the environmental differences within Central America.

In 1960, the land development agency allows you to choose a farm site in Central America. In addition to the decision on the country and departamento in which to locate your farm, you must also choose the crops to plant from the six available - corn, beans, rice, tobacco, coffee or cotton. There are some restrictions on each of these choices.[2]

The choice of farm location is based on your expert knowledge of good farming land. You must choose a site which has a favorable climate, good soil, moderate slopes, easily removable vegetation and other positive factors.[3] Your teacher may decide to use a chance drawing rather than having you make the choice.

The choice of crop is more restrictive. You may plant corn, beans and rice at first, alone or in combination of one acre plots up to ten acres total. You may grow tobacco after you have accumulated profits of $75, coffee after you have a nest egg of $125 and cotton after profits of $150. These are added expenses the first year you plant these crops. It will probably take many years to accumulate enough money to start planting tobacco, coffee, or cotton, and it is possible that you will never make enough money to grow them.[4]

You must sell your crop(s) to the capital of the departamento (state) of the country you have chosen. You have one burro for transportation, but you may use busses or trucks to transport your crops wherever roads are present.[5]

After you have chosen the country and departamento, you will locate your farm. If you are selecting the site use the base map to pinpoint the location and then decide which soil and climatic zone it is in, the distance to market, and mode of transport, either by burro or by truck if you are located on a road.[6] If farm site selection is by drawing a number, find the numbered site on the base map and follow the same procedure.

After you have decided which crop(s) to plant, information on yields per acre, the market price and the production cost will be made available to you by the game coordinator. The yields and prices will vary from year to year depending on environmental conditions, consumer demand and other causes of market fluctuation. In addition, chance cards will be drawn which may alter the year's income. Because you use only simple hand tools, the production cost will remain constant after your first year. The seasonal agricultural costs are avilable to you in the manual, but yields and prices will be announced by the game coordinator in class.

When you know your crop yields per acre, the market prices, the production cost, the freight rate and the distance to your market, you can calculate the profit or loss on the sale of your crop. Expenses are calculated by multiplying acreage times pounds of crop yield times production cost found with each crop description sheet in your packet. Transportation cost is determined by multiplying total crop poundage times mileage to market times transport rate. (For burro it is $.0003 per pound/mile and for truck or bus $.0001 per pound/mile.) Sum the production cost and transport cost for total production cost. Income is calculated by multiplying poundage for each crop times market price. Subtract expenses from income to determine if a profit has been made. Tables are provided in this manual for entering each of these factors for each crop you produce.

The yearly calculation of profits and losses will allow you to determine whether you are making or losing money on the sale of your crops. You can change your original decision on which crop(s) to plant if you see they are not profitable. You may change crops or crop combinations every year. You may find that it is consistently unprofitable to sell your crops to the departamento market and be forced to borrow money yearly from the land development agency (in this case, your instructor). You may find that some crops are profitable while others are not, depending on yearly changes in crop yields, low or high production costs, small or excessive freight rates, short or long market distances, and chance occurrences as determined by drawing a chance card at the end of each year. You may react to all these changing economic factors by changing crops or by decreasing or increasing your production of some crops, but whatever you do should be a logical reaction to the economic pressures on your and your farm. Even should you move deeply into debt, you should continue farming until the end of the game, assuming that the land development agency loans you enough money to start over with $50 each new planting year. Keep track of these loans on your crop profits and losses sheets in this manual.

The following pages provide information and tables for recording the economic history of your farm from 1960 to 1970. Please keep accurate and complete records!

Notes:

1. It is unlikely that you would express this intuition and initiative if you really were a subsistence farmer in Central America, not because you were lazy or ignorant, but because your way of life and system of values

would be different. Most farmers in Central America presumably are relatively content with their way of life, so you would be somewhat of an exception - a rebel, perhaps.

Most farmers are subsistence farmers (producing goods for their own use only) who rent land from large landowners (haecendados). The average Central American Farmer does not produce many crops for sale, so he rarely - if ever - keeps records of costs and prices. Surpluses left over after feeding one's family are commonly sold on the market, but this game assumes, for simplicity's sake, that all of each year's crop is sold.

Prices here are quoted in United States dollars even though each country in Central America has its own currency and rate of exchange. In Guatemala, one quetzal equals one dollar; in El Salvador, one colon equals $.40; in Honduras, one lempira equals $.50; in Nicaraqua, one cordoba equals $.14; and in Costa Rica, one colon equals $.15.

In reality there is no international land development agency in Central America.

2. In a real situation there are a number of other choices open. Perhaps it would be exceedingly difficult to become an independent farmer in the first place. For purposes of this game, however, we assume that it is possible to become an independent farmer and that there are several major agricultural choices to make. There are a great number of other crops grown in Central America, but time and space limitations here require that only six crops be presented for your choice.

3. The information on physical environment of Central America which may be presented in the class could be drawn from the excellent source by West, Robert C. (ed.) Natural Environment and Early Cultures, Vol. of Wauchope, Robert (ed.), Handbook of Middle American Indians, (Austin: University of Texas Press, 1964).

4. Each participant in this game is restricted to only ten acres of land for the total of all crops grown. Ten acres is probably the maximum size farm operated by a subsistence farmer in Central America. This games ignores, for simplicity's sake, the facts that corn and beans as well as other crops are planted together and that often more than one crop can be grown in the course of a single year. The original investment for cotton, coffee and tobacco is high.

5. You must sell your crops to your departamento capital during each year of the game, and you must sell all of any one year's crop to the same market at the same time. No hoarding is allowed; you must sell all of any crop you produce. Moreover, the rules of the game require that the prices for each crop remain uniform through all the markets in each individual country during each year, although in reality there are some spatial and temporal variations in market prices in Central America. Commonly the Central American farmer does carry his produce to market by burro or he does use a bus or truck if one is available.

6. Information on the location of the departamento market and the distance to market is determined by consulting the base map provided by your teacher. The base map is not necessarily the most current and for purposes of the game includes only "all-weather" roads.

7. Data on production costs are derived from Espina, Dario (Comp.), Prontuario del Tasador Agricola, (Tegucigalpa: Banco Nacional de Fomento, 1963). pp. 213, 215 and 225. The information on seasonal agricultural costs and crop requirements come from this source and, therefore, does not recognize recent inflationary trends in Central America. For purposes of the game, however, prices given are realistic.

Student Packet Materials
(on following pages)

Farm Economic Profile
Agriculture Production Costs for Selected Crops
Guidelines for Determining Yearly Crop Yields
Crop Profits and Losses, 1960-1970
Guidelines for Farm Profit and Loss Report

Note: Each student should have a copy of these materials.

FARM ECONOMIC PROFILE

Departamento: _____ Country: _____

Name of departamento market (capital): _____

Distance to market: _____ miles.
One kilometer equals .6 miles

Transport rate: _____

Climatic region: _____

Soil type: _____

AGRICULTURAL PRODUCTION COSTS

CORN (MAIZ PRIMERA)

Cost per pound

Corn costs an average of $.03 per pound to produce in Central America. Enter this figure in the column labelled "Cost Per Pound To Raise Crop" on the crop profits and loss sheet whenever you plant corn.

General Requirements

The vegetative period of corn varies from about 90 to 190 days. The crop requires considerable moisture and warmth from the time of planting to the end of the flowering period. During germination, most favorable temperatures seem to be about 65° F.; temperatures below 55° F. result in appreciable reductions in yields. During the vegetative period, weather should be warm, with average temperatures between 72° - 74° F. During the ripening of the grain corn needs considerable warmth and sunshine.

BEANS (FRIJOL PRIMERA)

Cost per pound

Beans cost an average of $.03 per pound to produce in Central America. Enter this figure in the column labelled "Cost Por Pound to Raise Crop" on the crop profits and loss sheet whenever you plant beans.

General Requirements

Beans are warm-season annuals, relatively sensitive to extremes of temperatures. The optimal seasonal temperatures for beans is about the same as those for corn. Beans demand a fairly uniform supply of moisture during the vegetative period.

UPLAND OR DRY RICE (ARROZ SECANO)

Cost per pound

Rice costs an average of $.02 per pound to produce in Central America. Enter this figure in the collumn labelled "Cost per Pound to Raise Crop" on the crop profits and loss sheet whenever you plant rice.

General Requirements

Minimum temperatures for germination of rice are 50° - 55° F. The minimum temperature for blooming is 72° F. and for ripening the optimum is about 68° F. Most upland rice varieties require average monthly temperatures of at least 65° F. during three months.

TOBACCO (TABACO)

Cost Per Pound

Tobacco costs an average of $.05 per pound to produce in Central America. Enter this figure in the column labelled "Cost per Pound to Raise Crop" on the crop profits and loss sheet whenever you plant tobacco.

General Requirements

Optimum temperatures for tobacco appear to lie between 64° and 81° F. Low average temperatures during the early part of the vegetative period greatly restrict its development. Moderate rainfall throughout the vegetative cycle is adequate for tobacco production.

COFFEE (CAFE)

Cost Per Pound

Coffee costs an average of $.09 per pound to produce in Central America. Enter this figure in the column labelled "Cost per Pound to Raise Crop" on the crop profits and loss sheet whenever you plant coffee.

General Requirements

Coffee requires a total annual precipitation of from 50 to 90 inches, well distributed thoughout the year with a minimum during the flowering season. In general, optimum temperatures appear to lie between 60° and 78° F.

COTTON (ALGODON)

Cost Per Pound

Cotton costs an average of $.14 per pound to produce in Central America. Enter this figure in the column labelled "Cost Per Pound to Raise Crop" on the crop profits and loss sheet whenever you plant cotton.

General Requirements

Cotton is adapted to the humid subtropics where the frost free season is at least 200 - 210 days and the summer isotherm is 77°F. or more. The minimum rainfall limit is considered to be about 20 to 25 inches unless irrigation is practiced. Total autumn rainfall in excess of ten inches is likely to be injurious, and relatively dry, cool conditions at harvest time are preferred. Cotton is planted in the spring when temperatures are at least 60° F.; heavy rains at planting time and during early growth stages are undesirable.

GUIDELINES FOR DETERMINING YEARLY CROP YIELDS

The crop yields of corn, beans, rice, tobacco, coffee and cotton in Central America vary from year to year depending on a number of factors. For purposes of this Subsistence Agriculture Game, weather conditions are considered the primary factors determining crop yields.

Crop yields on your farm will deviate up or down from the average depending on favorable or unfavorable weather conditions during each year's growing season. The average yield of corn in Central America is considered to be 400 pounds per acre, of beans 800 pounds per acre, of rice 800 pounds per acre, of coffee 200 pounds per acre, of tobacco 800 pounds per acre and of cotton 1,000 pounds per acre.

The crop yields on your farm will be average unless particularly favorable or unfavorable weather conditions occur during the growing season. Your crop yields will vary according to the scale below.

Yields in Pounds per Acre

Percentage Variation	Crop: Corn	Beans	Rice	Tobacco	Coffee	Cotton
+100	800	1600	1600	1600	400	2000
90	760	1520	1520	1520	380	1900
80	720	1440	1440	1440	360	1800
70	680	1360	1360	1360	340	1700
60	640	1280	1280	1280	320	1600
50	600	1200	1200	1200	300	1500
40	560	1120	1120	1120	280	1400
30	520	1040	1040	1040	260	1300
20	480	960	960	960	240	1200
10	440	880	880	880	220	1100
Average	400	800	800	800	200	1000
10	360	720	720	720	180	900
20	320	640	640	640	160	800
30	280	560	560	560	140	700
40	240	480	480	480	120	600
50	200	400	400	400	100	500
60	160	320	320	320	80	400
70	120	240	240	240	60	300
80	80	160	160	160	40	200
90	40	80	80	80	20	100
-100	0	0	0	0	0	0

CROP PROFITS AND LOSSES, 1961 - 1970

Year	Crop	Areas Planted	Pounds Per Acre Yield	Total Crop Yield in Lbs.	Market Price Per Pound	Revenue from Crop	Total Transport Cost	Cost Per Lb. to Raise Crop	Total Cost to Raise Crop	Net Profit	Accrued Profit	Loans and Unforeseen Expenses
1961	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1962	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1963	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1964	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1965	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											

Year	Crop	Areas Planted	Pounds Per Acre Yield	Total Crop Yield in Lbs.	Market Price Per Pound	Revenue from Crop	Total Transport Cost	Cost Per Lb. to Raise Crop	Total Cost to Raise Crop	Net Profit	Accrued Profit	Loans and Unforeseen Expenses
1966	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1967	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1968	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1969	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											
1970	Corn											
	Beans											
	Rice											
	Tobacco											
	Coffee											
	Cotton											

GUIDELINES FOR FARM PROFIT AND LOSS REPORT

A comprehensive report on farm profits and losses is expected of each subsistence farmer after completing his farming experience. Please include the following guidelines in writing the report. Use the following pages for writing or typing the report.

1. Why did you choose to locate your farm in its present place?
2. On what basis did you make decisions on which crops to plant yearly?
3. If you used burro transport, what would have been your yearly and total profit or loss if you had used truck transport?
4. If you used truck transport, what would have been your yearly and total profit or loss if you used burro transport?
5. What would have been your yearly and total profit or loss if you had used the national capital's market rather than your departamento's market in the sale of your crops?
6. What other conditions might have made your farm profitable if it was unprofitable in one or more years of farming?
7. What are your recommendations for the next ten years of farming at your present location?
8. How does your general farm situation compare and contrast with that of other farmers in your country and elsewhere in Central America?
9. Please contribute your candid, explicit comments on the usefulness of the Subsistence Agriculture Game for learning about subsistence agriculture in Central America.